



PSE2500-A3
External PoE Power System
User Manual

Hangzhou Huawei-3Com Technology Co., Ltd
<http://www.huawei-3com.com>




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To obtain the latest information, please access:

Technical Support

customer_service@huawei-3com.com

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About This Manual

Organization

H3C PSE2500-A3 External PoE Power System User Manual is organized as follows:

Chapter	Contents
1 Introduction	Introduces the concept and features of power supply.
2 System Description	Introduces the structure and electrical connection of power supply.
3 Safety	Introduces the safety information of the overall system.
4 Installation and Debugging	Introduces the installing and debugging of the overall system.
5 Engineering Maintenance and Troubleshooting	Introduces the routine maintenance and troubleshooting of the system.

Conventions

The manual uses the following conventions:

I. Command conventions




Convention	Description
Boldface	The keywords of a command line are in Boldface .
<i>italic</i>	Command arguments are in <i>italic</i> .
[]	Items (keywords or arguments) in square brackets [] are optional.
{ x y ... }	Alternative items are grouped in braces and separated by vertical bars. One is selected.
[x y ...]	Optional alternative items are grouped in square brackets and separated by vertical bars. One or none is selected.
{ x y ... } *	Alternative items are grouped in braces and separated by vertical bars. A minimum of one or a maximum of all can be selected.
[x y ...] *	Optional alternative items are grouped in square brackets and separated by vertical bars. Many or none can be selected.
#	A line starting with the # sign is comments.

II. GUI conventions

Convention	Description
< >	Button names are inside angle brackets. For example, For example, click <OK>.

Convention	Description
[]	Window names, menu items, data table and field names are inside square brackets. For example, pop up the [New User] window.
/	Multi-level menus are separated by forward slashes. For example, [File/Create/Folder].

III. Symbols

Convention	Description
 Warning	Means reader be extremely careful. Improper operation may cause bodily injury.
 Caution	Means reader be careful. Improper operation may cause data loss or damage to equipment.
 Note	Means a complementary description.

Environmental Protection

This product has been designed to comply with the requirements on environmental protection. For the proper storage, use and disposal of this product, national laws and regulations must be observed.

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Chapter 1 Introduction

1.1 Architecture and Configurations

PSE2500-A3 power system is the extremely flexible system with strong functions which are designed for PoE application. It can provide power of up to 2500 W with 1+1 redundant configuration.

PSE2500-A3 architecture integrates two rectifiers (maximum 3 rectifiers), a system controller, and the distribution module in a 4U high chassis. Local monitor and control of the device status can be implemented with the system controller.

The general configuration is shown as follows:

Table 1-1 PSE2500-A3 configuration

Description	Standard Configuration
4U high chassis	D x W x H- 380 x 486 x 175mm(14.96 x 19.13x6.89 in)
System controller	One
NP series Rectifier	One NP2500UAC-PoE
AC distribution components	1) Three independent lines AC power input each of socket – with an individual switch 2) 3-phase AC voltage sensor

Description	Standard Configuration
DC distribution components	Single load output with the max. Load of 2500W
Other	-

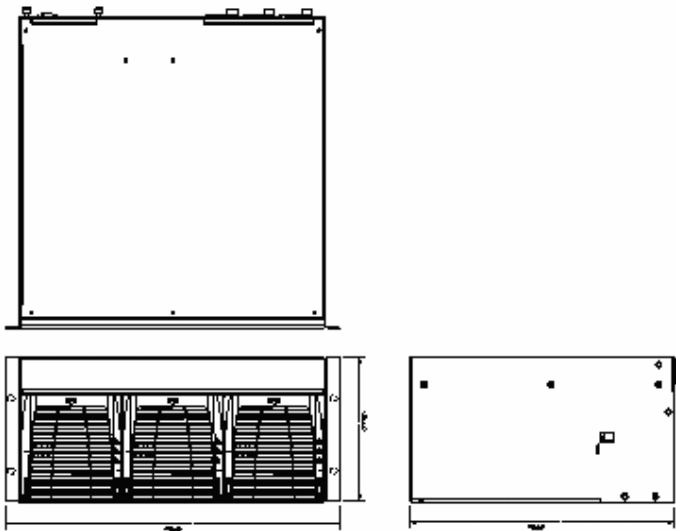


Figure 1-1 PSE2500-A3 system

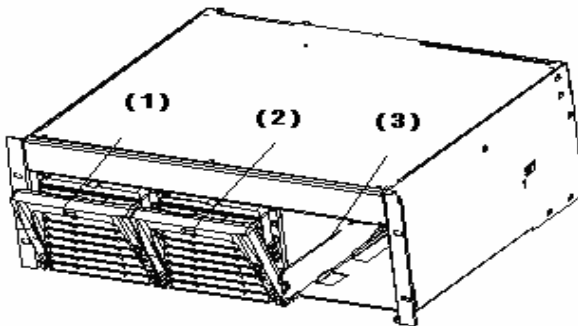
Note:

PSE2500-A3 system is configured with one rectifier modules.

1.2 Features

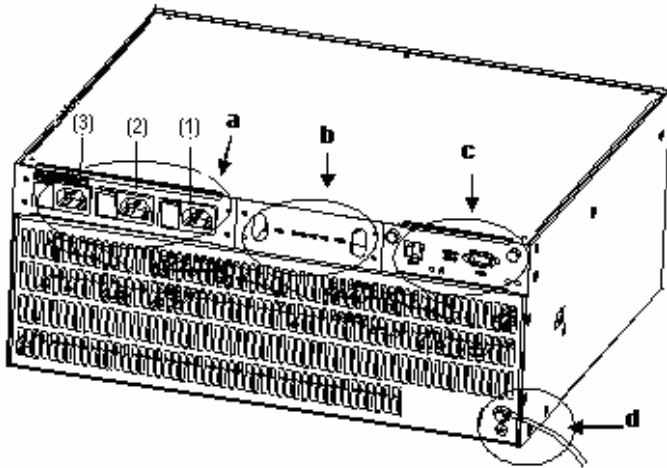
PSE2500-A3 system has the following features:

- Compatible with a wide range of input voltages from 90Vac to 264Vac (configured with NP2500UAC-PoE rectifiers).
- Each bracket is configured with three rectifiers.
- Power factor is above 0.99 and efficiency is over 88% .
- Maximum device output 2500W.
- System Controller can real-time monitor and operate the system.
- Applying hot-swappable components to accomplish quick installation.
- Achieving remote control through RS232 or RS485 interface.
- Advanced EMC design.
- High Safety and reliability.



(1)(2)(3): NP2500UAC-PoE Rectifier

Figure 1-2 PSE2500-A3 configuration (I)



(a): AC Input Socket
(c): RS232 and RS485

(b): DC Output
(d): Frame Ground

Figure 1-3 PSE2500-A3 configuration (II)

Chapter 2 System Description

2.1 Overview

Figure 2-1 shows the schematic diagram of the PSE2500-A3 power system, showing the interconnections and signal flow among the modules and components.

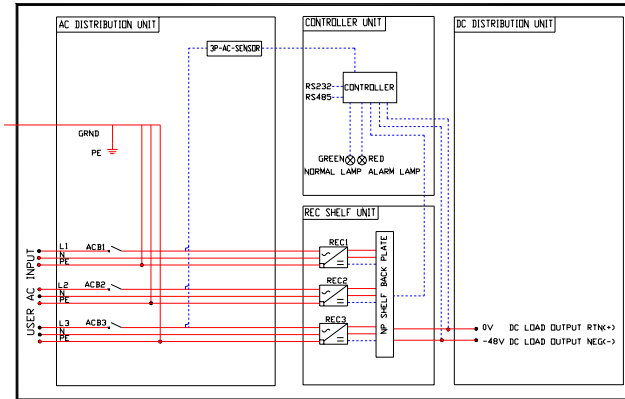


Figure 2-1 Schematic diagram of the PSE2500-A3

2.1.1 Rectifier

The output bus power is supplied by the rectifiers.

2.1.2 Rectifier Bracket

Up to three rectifiers can be mounted in each system of rectifier bracket. Each rectifier in the bracket receives AC power from the AC distribution.

2.1.3 Rectifier Visual Displays

The front panel of the rectifier has three LEDs. Their names, colors and meanings are as follows.

Table 2-1 LEDs state description

Condition	AC OK (green)	DC OK (green)	Fault (Red)
All OK	1	1	0
Thermal alarm (Ambient)	1	0	0
Thermal alarm (fan fail)	1	0	1
Blown AC fuse in unit	1	0	1
Low or no AC > 15mS (single unit)	0	0	0
AC not present in any rectifier	0	0	0
Over Voltage Latched shutdown	1	0	1
Any internal failure	1	0	1

The Front panel of the rectifier is as follows.

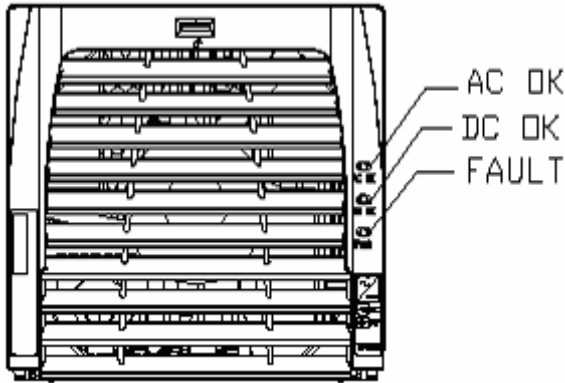


Figure 2-2 Front panel of the rectifier

2.2 Controller

The system controller of PSE2500-A3 is installed within the chassis. See figure 2-3.

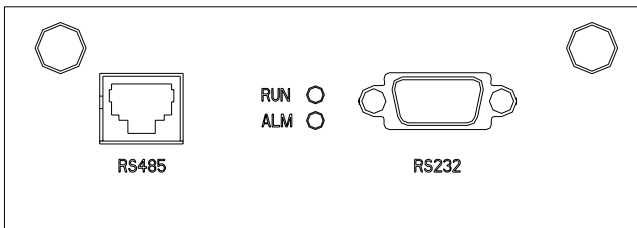


Figure 2-3 Front panel of the controller

There are green LED (RUN) indicating operation status and red LED (ALM) indicating the alarm on the front panel of the PSE2500-A3 controller. When the system has an alarm, such as input failure, input over-voltage or under-voltage, output over-voltage or under-voltage,

rectifier failure, rectifier self-protection, the red LED is on. Once the alarm is gone, the red LED goes off.

The controller of the PSE2500-A3 has two major functions:

I. Monitoring the system operation status

Inside PSE2500-A3 there is an AC sensor card, which can sample the AC input voltage. The sampled signal is sent into the controller for data processing. Once the input voltage is lower than the pre-set alarm level of the input low voltage, the controller reports an AC input under-voltage alarm. Likewise, if the input voltage is higher than the pre-set alarm level of the input high voltage, the controller reports an AC input over-voltage alarm.

The sampled DC output voltage signal is also sent into the controller. Once the output voltage is lower than the pre-set alarm level of the output low voltage, the controller will reports a DC Low alarm. Likewise, if the output voltage is higher than the pre-set alarm level of the output high voltage, the controller reports a DC output high alarm.

The rectifier communicates with the controller through RS485 bus. The working status of the rectifier is passed to the controller in this way. Once the rectifier has an alarm, the information is passed to the controller. The rectifier failure alarm includes: AC input failure, DC output failure, fan failure, output high, over temperature, and module shut-down.

II. Communicate with deamon systems

The controller supports China national standard protocol YD/T 1104-2001. User can apply this protocol to read system information or

command the operation through equipment which has RS232 or RS485 interface and can support this protocol.

There is one RS485 port and one RS232 interface on the rear panel.

Their definitions are as follows:

Table 2-2 RS232

Pin	Definition
1	Not used
2	Receive
3	Transmit
4	Not used
5	Ground
6	Not used
7	Not used
8	Not used
9	Not used

Table 2-3 RS485

Pin	Definition
1	Transmit, +
2	Transmit, -
3	Receive, +

Pin	Definition
4	Ground
5	Not used
6	Receive, -
7	Ground
8	Not used

2.3 AC Distribution Unit

There are three AC input sockets on the rear panel of the device rating at 20 A, 250VAC. Each socket supplies one rectifier module. There are three switches beside each socket which is rated at 20 A 250VAC. They control the on/off of each supply.

2.4 DC Distribution Unit

Copper bus bars and two 10 mm² cables provide 54 VDC output of the device. You can connect the output of this device to user equipments by using them.

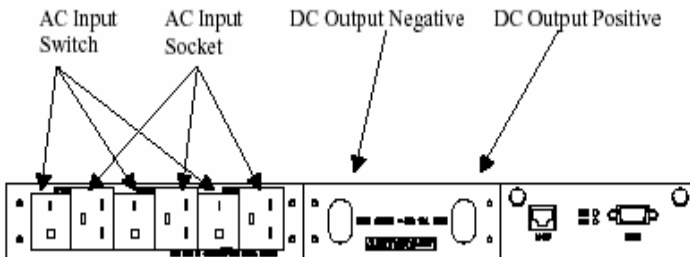


Figure 2-4 Distribution panel

Chapter 3 Safety

3.1 Safety Statements





Please read and follow all safety instructions and warnings before servicing the PSE2500-A3 system. Reference the individual module product manuals for additional safety statements specific to the modules.

- The device must be in a restricted access area (dedicated equipment rooms, equipment closets, or the like) where the applicable requirements of the device are met.
- The equipment must be in a controlled environment (an area where the humidity is maintained at levels that cannot cause condensation on the equipment, the contaminating dust is controlled, and the steady-state ambient temperature is within the range specified).
- Do not install this equipment at a combustible place.
- This equipment has been evaluated for use in a continuous ambient temperature of up to 50°C.
- Torque electrical connections conform to the values specified on labels or in the product documentation.
- Refer to the product documentation for the proper hardware. Use only the parts specified in the equipment documentation
- Improper fuses/circuit breakers may cause body injury or equipment damages.
- External circuit breakers must be sized as required by the applicable local codes. Refer to the equipment ratings to

assure rating of equipment no to exceed 80% of the value of the breaker chosen.

3.2 Warning Statements and Safety Symbols

The symbols may sometimes be accompanied by some types of statement, for example “Hazardous voltage/energy inside”, “Risk of injury”. “This device must be accessed only by qualified personnel.”

	This symbol identifies the need to refer to the equipment instructions for important information.
	This symbol is used to identify the protective safety earth ground for the equipment.
	This symbol is used to identify other bonding points within the equipment.
	This symbol is used to identify the presence of hazardous ac or dc voltages. It may also be used to warn of hazardous energy levels.

 **Note:**

These symbols are used to identify the presence of hazardous AC/DC main voltage and also can be used to alarm the level of danger.

3.3 Precautions

When working on this type of equipment, the following precautions must be noted:

- This unit must be installed, serviced, and operated only by skilled and qualified personnel who have the necessary knowledge and practical experience with electrical equipment and who understand the hazards that can arise when working on this equipment.
- The PSE2500-A3 system can be powered by multiple AC inputs. Ensure that the appropriate circuit protection device for each AC input being serviced is disconnected before servicing the equipment.
- High leakage currents may be possible on this type of equipment. Make sure the equipment is properly earth grounded before connecting power.
- Hazardous energy and voltages are present in the device and on the interface cables that can shock or cause serious injury. Follow all safety warnings and practices when servicing this equipment.
- Exercise care when servicing this area.

In addition to proper job training and safety procedures, the following are some basic precautions that should always be used:

- Use **only** properly insulated tools.
- Remove all metallic objects (key chains, glasses, rings, watches, or jewelry, and so on).
- Wear safety glasses.
- Test circuits before touching.

- Lock out and tag any circuit breakers/fuses when possible to prevent accidental turn on.
- Be aware of potential hazards before servicing equipment.
- Identify exposed hazardous electrical potentials on connectors or, wirings. (Note the condition of these circuits, especially any wiring).
- Be careful when removing or replacing any covers – avoid contacting any circuits.

Chapter 4 Installation and Debugging

4.1 Introduction

This section outlines the sequence for installing the PSE2500-A3 device, including plug-in modules, as well as test procedures for verifying the integrity of the installation.

4.1.1 Guidelines

The device may be installed to allow rear and front access. All cables may be routed through conduit openings, and all the operation can be completed on the front side.

4.1.2 EMI Considerations

When running the dc output cables, pair the positive and negative conductors over as much of their length as possible to minimize loop areas.

4.1.3 Installation Tools and Hardware

You will need the following tools and hardware to install and test the PSE2500-A3 unit:

- Wire cutters and strippers
- Heat shrink gun and appropriately sized heat-shrink tubing
- Electric screwdriver with 6 mm (0.24 in.) hex head with variable torque range, 0 to 120 in lbs (0 to 13.6 N.m)
- Adjustable wrench
- M8 sleeve

- Digital meter with an accuracy of $\pm 0.02\%$
- Small flat screw driver
- ESD wrist strap

4.1.4 Safety



Warning:

- Only qualified personnel can install and service the PSE2500-A3 device.
 - Hazardous energy is present in the device and on the interface cables, and will shock or cause serious injury or death if safety precautions are ignored. Follow all safety warnings and practices when servicing this equipment.
-

4.1.5 Installation Sequence

Review all safety warnings in Section 3 before beginning the installation process. Observe all warnings and labels on the equipment.

The PSE2500-A3 system consists of a chassis in which includes AC and DC distribution modules, one system controller, and one rectifier bracket. Refer to Figures 2-6 and figure 2-7 for relationship of components.

Note that the PSE2500-A3 is shipped to the customer site mostly pre-assembled so as to minimize the overall installation process. The following installation sequence is recommended

- Physical mounting
- Installing rectifiers
- Frame grounding
- Connecting to loads
- Connecting to AC utility/AC grounding
- Initializing the system

4.2 Physical Mounting

All items needed for a site are contained within the packing crate. The ordered rectifiers may be shipped separately. Please check the packing list.

- 1) Place the crate in its vertical position near the installation site.
- 2) Carefully remove the crate top and sides and then the packing material. If possible, recycle the packing crate and the packing material. If not, dispose of properly.
- 3) Within the packing crate may be the following items: chassis, rectifiers, and cables. Remove all this material and place aside.
- 4) Install the chassis into the 19-inch standard cabinet by using eight pieces of M6 screws. Notes that use the electric screwdriver and correct torque setting (recommend 6.2 to 6.5 N.m). See figure 4-1.

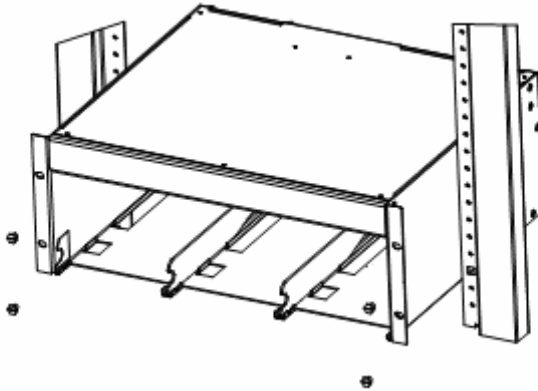


Figure 4-1 Physical installation

4.3 Installing Rectifiers

Standalone rectifier is installed by sliding into the power bracket, pushing until the rectifier is fully inserted, and closing the handle on the rectifier.

- 1) Verify that the AC circuit breakers in the distribution module are in the “OFF” position
- 2) Place the module in the bracket and slide it toward the backplane until it contacts the backplane
- 3) Close the handle on the front of the rectifier and verify that the rectifier is firmly seated.

See Figure4-2 for the rectifier installation.

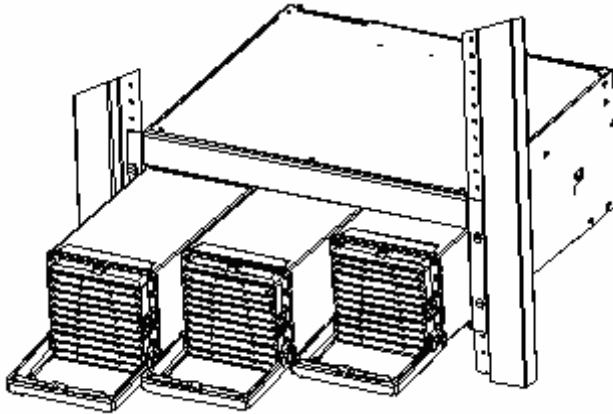


Figure 4-2 Installing rectifiers

4.4 Frame Grounding

Before connecting the electrical cables to the system, you must first ground the frame.

- 1) Recommended the 16 mm² cable with a M6 single hole terminal lug is connected to PE grounding terminal on the rear of the chassis, as shown in Figure 4-3.
- 2) Follow all local rules in terms of colors for the frame grounding conductor. Terminate the other end of the conductor to a grounding plate or other acceptable ground point.

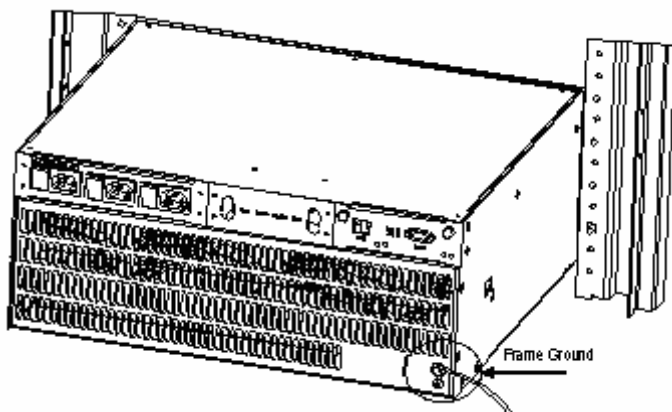


Figure 4-3 Frame grounding

4.5 Load Connections

All the load connections must be connected to the OT type terminal of the device's output cable. The positive load cable must be connected to load positive terminal and the negative load cable must be connected to load negative terminal. Choose the appropriate size cables based on load currents.

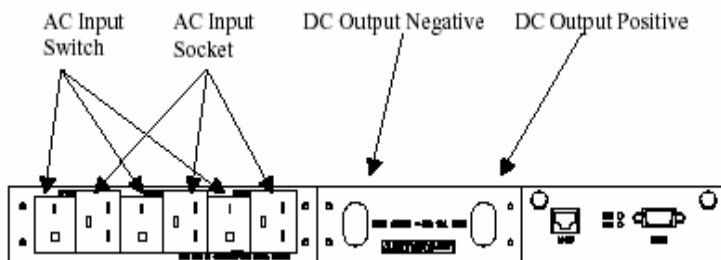


Figure 4-4 Load connections

4.6 Connecting to AC utility/ AC grounding

The AC main inputs can be accessed from the back of the unit. Recommended IEC 320C-19 plug/socket and appropriate cable for AC input connection.

AC cable for branch circuit must be sized as required by the U.S. National Electric Code (the cable length shall be minimum 1.5m and not exceed 4.5m) and /or local codes.

Power plugs for the equipment appliance inlet must be plugged into independent wall socket outlet to ensure the earth connection through the supply. The socket outlet shall be installed near the equipment and shall be easily accessible.

The AC utility connection must follow this procedure:

- 1) Turn off the AC input switch.
- 2) Plug the AC input power cord into the corresponding AC socket.

For related connection position see figure 4-4.

4.7 Initial Start-up

The device is ready to be powered up. First, verify that all AC branch circuit breakers are OFF.

4.8 Powering on the Device

- Ensure that all rectifiers are locked into position in the bracket with the front handle.
 - Turn the AC service circuit breakers ON.
 - Turn the AC branch circuit breakers ON.
- 1) Turn the AC switches of rectifiers ON.

- 2) Verify that the “AC OK”, “DC OK”, and green LED are on and the fan operates on each rectifier.
- 3) Wait approximately 10-30 seconds to allow the system to go through its start-up procedure.
- 4) Verify that the green LED on the controller panel is on. All alarm LEDs should be off after all rectifiers are latched in place and all AC circuit breakers are closed.
- 5) Using a digital voltmeter to verify that the plant voltage is approximately 54V, the default factory setting for the controller.
- 6) Turn one the AC power input switch off to verify that the red alarm LED lights on the controller.
- 7) For systems with more than one rectifier installed, turn the second AC input switch off to verify that the FAULT LED lights on the controller. Clear the alarms by turning the AC circuit breaker on.

When the system shipped from the factory, normally all the systems parameters have been configured as the default value. Contact Hangzhou Huawei-3Com Technology Co., Ltd. if special setting is needed.

Chapter 5 Engineering Maintenance and Troubleshooting

5.1 Maintenance and Troubleshooting

This section provides field maintenance and troubleshooting information and procedures for the power system. Before performing the maintenance procedures, review the safety information in Section 3.



Warning:

All procedures described in this section must be performed by qualified maintenance personnel only.

The power devices are repaired by replacement. Contact Hangzhou Huawei-3Com Technology Co., Ltd. for more details.

5.2 LED Indication

Use the following table to determine if there is any problem with PSE2500-A3 power system with a controller.

When visual indicators do not identify a defective part, notify Hangzhou Huawei-3Com Technology Co., Ltd.

Table 5-1 Troubleshooting guide

Controller alarm status	Rectifier display	Possible problems	Possible solution
RUN ALM	NONE	<ul style="list-style-type: none"> The AC power input circuit breakers has operated. AC input voltage is too low or power lost 	<ul style="list-style-type: none"> Verify that AC power input circuit breaker is closed; close circuit breaker if it is open. Verify the AC power is present and in normal range
RUN ALM	AC OK FAULT	Rectifier failure Output beyond normal range	Replace the rectifier
RUN ALM	AC OK DC OK FAULT	Communication error between the rectifier and the controller	Replace the rectifier
RUN ALM	AC OK	Rectifier has no output and it is in standby mode; Over load; Ambient temperature is too high Rectifier failure;	Command the rectifier to work or reset the controller Check if the load is over the rating. Check the ambient temperature. Replace the rectifier

Controller alarm status	Rectifier display	Possible problems	Possible solution
ALM or None	any	Controller failure	Replace the controller

5.3 Regulatory compliance standards

Table 5-2 Regulatory compliance standards

Discipline	Standards
EMC	FCC Part 15 (CFR 47) Class A CISPR 22 Class A EN 55022 Class A AS/NZS CISPR 22 Class A ETSI EN 300 386 V1.3.2 EN 55024
Safety	UL 60950-1 CSA C22.2 No 60950-1 IEC 60950-1 EN 60950-1 AS/NZS 60950-1